2 Chapter Review

Check It Out
Vocabulary Help
BigIdeasMath.com

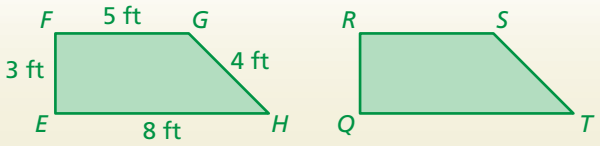
Review Key Vocabulary

congruent figures, *p. 44*
corresponding angles, *p. 44*
corresponding sides, *p. 44*
transformation, *p. 50*
image, *p. 50*
translation, *p. 50*
reflection, *p. 56*
line of reflection, *p. 56*
rotation, *p. 62*
center of rotation, *p. 62*
angle of rotation, *p. 62*
similar figures, *p. 72*
dilation, *p. 84*
center of dilation, *p. 84*
scale factor, *p. 84*

Review Examples and Exercises

2.1 Congruent Figures *(pp. 42–47)*

Trapezoids *EFGH* and *QRST* are congruent.



a. What is the length of side *QT*?

Side *QT* corresponds to side *EH*.

∴ So, the length of side *QT* is 8 feet.

b. Which angle of *QRST* corresponds to ∠*H*?

∴ ∠*T* corresponds to ∠*H*.

Exercises

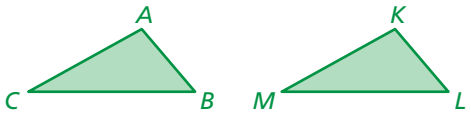
Use the figures above.

1. What is the length of side *QR*?

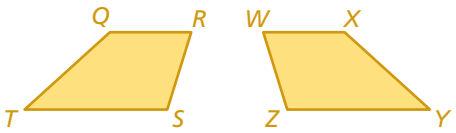
2. What is the perimeter of *QRST*?

The figures are congruent. Name the corresponding angles and the corresponding sides.

3.



4.

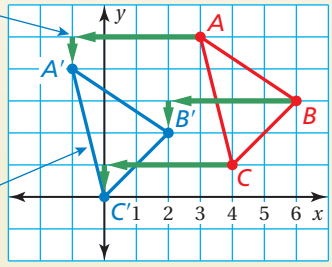


2.2 Translations *(pp. 48–53)*

Translate the red triangle 4 units left and 1 unit down. What are the coordinates of the image?

Move each vertex 4 units left and 1 unit down.

Connect the vertices. Label as *A*′, *B*′, and *C*′.

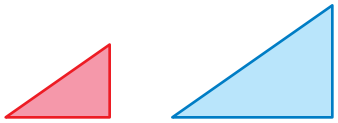


∴ The coordinates of the image are *A*′(−1, 4), *B*′(2, 2), and *C*′(0, 0).

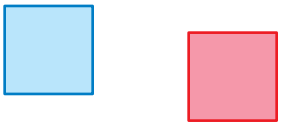
Exercises

Tell whether the blue figure is a translation of the red figure.

5.



6.

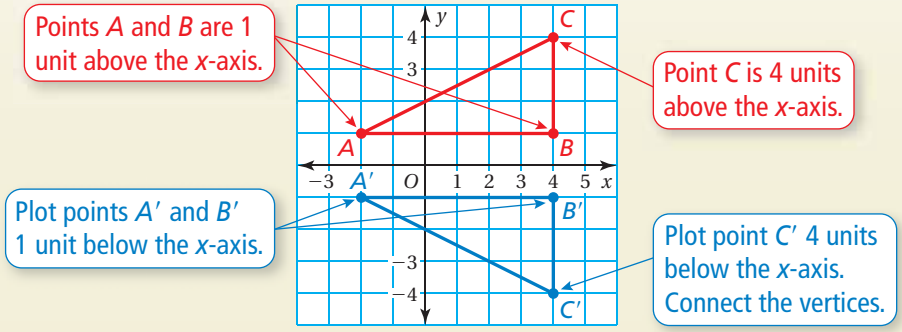


7. The vertices of a quadrilateral are $W(1, 2)$, $X(1, 4)$, $Y(4, 4)$, and $Z(4, 2)$. Draw the figure and its image after a translation 3 units left and 2 units down.

8. The vertices of a triangle are $A(-1, -2)$, $B(-2, 2)$, and $C(-3, 0)$. Draw the figure and its image after a translation 5 units right and 1 unit up.

2.3 Reflections *(pp. 54–59)*

The vertices of a triangle are $A(-2, 1)$, $B(4, 1)$, and $C(4, 4)$. Draw the figure and its reflection in the x-axis. What are the coordinates of the image?

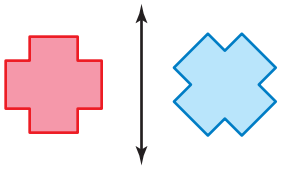


∴ The coordinates of the image are $A'(-2, -1)$, $B'(4, -1)$, and $C'(4, -4)$.

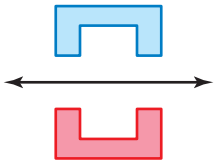
Exercises

Tell whether the blue figure is a reflection of the red figure.

9.



10.



Draw the figure and its reflection in (a) the x-axis and (b) the y-axis.

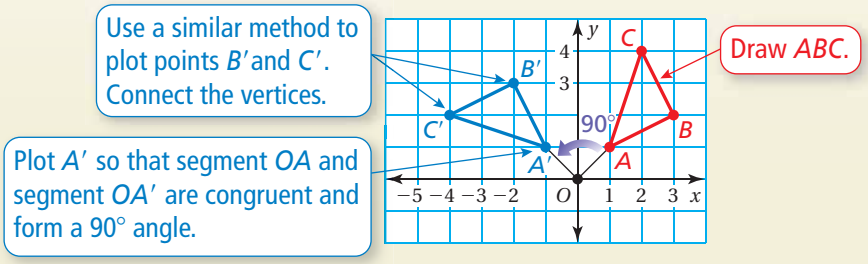
11. $A(2, 0)$, $B(1, 5)$, $C(4, 3)$

12. $D(-5, -5)$, $E(-5, -1)$, $F(-2, -2)$, $G(-2, -5)$

13. The vertices of a rectangle are $E(-1, 1)$, $F(-1, 3)$, $G(-5, 3)$, and $H(-5, 1)$. Find the coordinates of the figure after reflecting in the x-axis, and then translating 3 units right.

2.4 Rotations *(pp. 60–67)*

The vertices of a triangle are $A(1, 1)$, $B(3, 2)$, and $C(2, 4)$. Rotate the triangle 90° counterclockwise about the origin. What are the coordinates of the image?

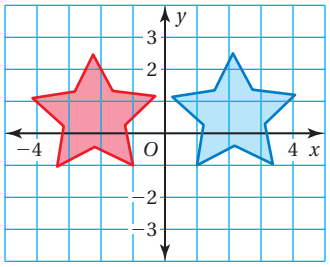


∴ The coordinates of the image are $A'(-1, 1)$, $B'(-2, 3)$, and $C'(-4, 2)$.

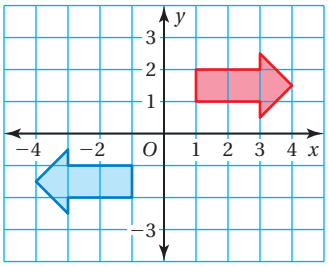
Exercises

Tell whether the blue figure is a rotation of the red figure about the origin. If so, give the angle and the direction of rotation.

14.



15.



The vertices of a triangle are $A(-4, 2)$, $B(-2, 2)$, and $C(-3, 4)$. Rotate the triangle about the origin as described. Find the coordinates of the image.

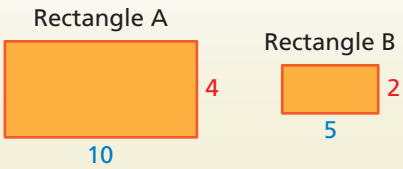
16. 180°

17. 270° clockwise

2.5 Similar Figures *(pp. 70–75)*

a. Is Rectangle A similar to Rectangle B?

Each figure is a rectangle. So, corresponding angles are congruent. Check to see if corresponding side lengths are proportional.



$$\frac{\text{Length of A}}{\text{Length of B}} = \frac{10}{5} = 2 \qquad \frac{\text{Width of A}}{\text{Width of B}} = \frac{4}{2} = 2$$

Proportional

∴ So, Rectangle A is similar to Rectangle B.

b. The two rectangles are similar. Find x.

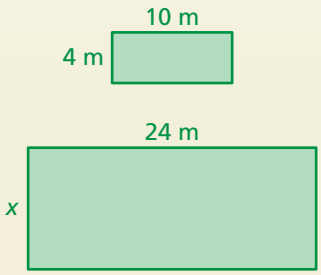
Because the rectangles are similar, corresponding side lengths are proportional. So, write and solve a proportion to find x.

$\frac{10}{24} = \frac{4}{x}$ Write a proportion.

$10x = 96$ Cross Products Property

$x = 9.6$ Divide each side by 10.

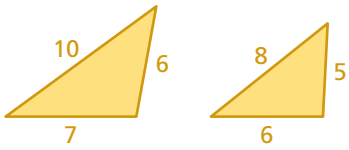
So, x is 9.6 meters.



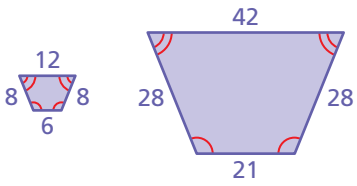
Exercises

Tell whether the two figures are similar. Explain your reasoning.

18.

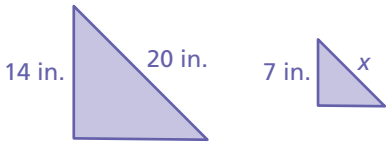


19.

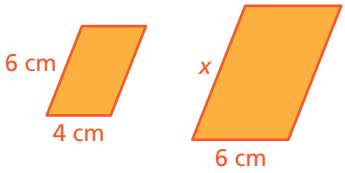


The figures are similar. Find x.

20.



21.

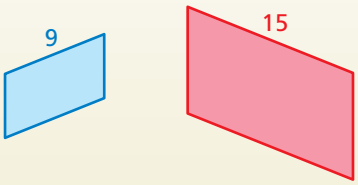


2.6 Perimeters and Areas of Similar Figures *(pp. 76–81)*

a. Find the ratio (red to blue) of the perimeters of the similar parallelograms.

$\frac{\text{Perimeter of red parallelogram}}{\text{Perimeter of blue parallelogram}} = \frac{15}{9}$

$= \frac{5}{3}$

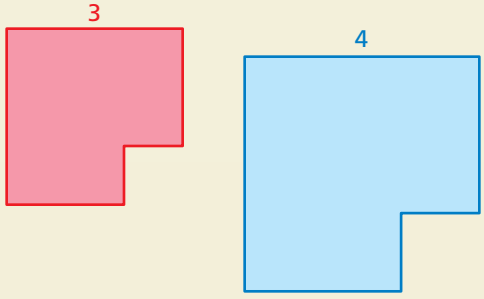


The ratio of the perimeters is $\frac{5}{3}$.

b. Find the ratio (red to blue) of the areas of the similar figures.

$\frac{\text{Area of red figure}}{\text{Area of blue figure}} = \left(\frac{3}{4}\right)^2$

$= \frac{9}{16}$

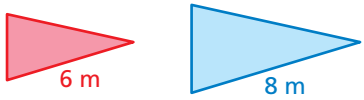


The ratio of the areas is $\frac{9}{16}$.

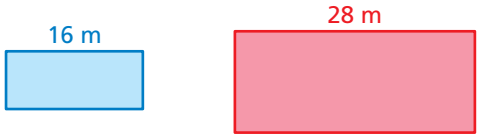
Exercises

The two figures are similar. Find the ratios (red to blue) of the perimeters and of the areas.

22.



23.



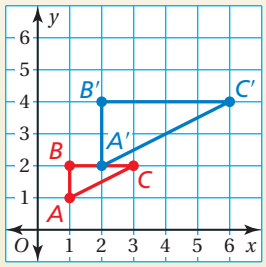
24. PHOTOS Two photos are similar. The ratio of the corresponding side lengths is 3 : 4. What is the ratio of the areas?

2.7 Dilations *(pp. 82–89)*

Draw the image of Triangle *ABC* after a dilation with a scale factor of 2. Identify the type of dilation.

Multiply each *x*- and *y*-coordinate by the scale factor 2.

Vertices of *ABC*	(2*x*, 2*y*)	Vertices of *A′B′C′*
$A(1, 1)$	$(2 \cdot 1, 2 \cdot 1)$	$A'(2, 2)$
$B(1, 2)$	$(2 \cdot 1, 2 \cdot 2)$	$B'(2, 4)$
$C(3, 2)$	$(2 \cdot 3, 2 \cdot 2)$	$C'(6, 4)$



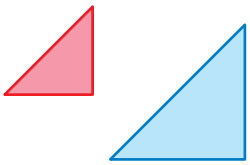
∴ The image is shown at the above right. The dilation is an *enlargement* because the scale factor is greater than 1.

Exercises

Tell whether the blue figure is a dilation of the red figure.

25.

26.



The vertices of a figure are given. Draw the figure and its image after a dilation with the given scale factor. Identify the type of dilation.

27. $P(-3, -2)$, $Q(-3, 0)$, $R(0, 0)$; $k = 4$

28. $B(3, 3)$, $C(3, 6)$, $D(6, 6)$, $E(6, 3)$; $k = \frac{1}{3}$

29. The vertices of a rectangle are $Q(-6, 2)$, $R(6, 2)$, $S(6, -4)$, and $T(-6, -4)$. Dilate the rectangle with respect to the origin using a scale factor of $\frac{3}{2}$. Then translate it 5 units right and 1 unit down. What are the coordinates of the image?